



education

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NATIONAL CERTIFICATES (VOCATIONAL)

ASSESSMENT GUIDELINES

FITTING AND TURNING NQF LEVEL 2

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SECTION A: PURPOSE OF THE SUBJECT ASSESSMENT GUIDELINES

This document provides the lecturer with guidelines to develop and implement a coherent, integrated assessment system for Fitting and Turning in the National Certificates (Vocational). It must be read with the *National Policy Regarding Further Education and Training Programmes: Approval of the Documents, Policy for the National Certificates (Vocational) Qualifications at Levels 2 to 4 on the National Qualifications Framework (NQF)*. This assessment guideline will be used for National Qualifications Framework Levels 2-4.

This document explains the requirements for the internal and external subject assessment. The lecturer must use this document with the *Subject Guidelines: Fitting and Turning* to prepare for and deliver Fitting and Turning. Lecturers should use a variety of resources and apply a range of assessment skills in the setting, marking and recording of assessment tasks.

SECTION B: ASSESSMENT IN THE NATIONAL CERTIFICATES (VOCATIONAL)

1 ASSESSMENT IN THE NATIONAL CERTIFICATES (VOCATIONAL)

Assessment in the National Certificates (Vocational) is underpinned by the objectives of the National Qualifications Framework (NQF). These objectives are to:

- Create an integrated national framework for learning achievements.
- Facilitate access to and progression within education, training and career paths.
- Enhance the quality of education and training.
- Redress unfair discrimination and past imbalances and thereby accelerate employment opportunities.
- Contribute to the holistic development of the student by addressing:
 - social adjustment and responsibility;
 - moral accountability and ethical work orientation;
 - economic participation; and
 - nation-building.

The principles that drive these objectives are:

- **Integration**

To adopt a unified approach to education and training that will strengthen the human resources development capacity of the nation.

- **Relevance**

To be dynamic and responsive to national development needs.

- **Credibility**

To demonstrate national and international value and recognition of qualification and acquired competencies and skills.

- **Coherence**

To work within a consistent framework of principles and certification.

- **Flexibility**

To allow for creativity and resourcefulness when achieving Learning Outcomes, to cater for different learning styles and use a range of assessment methods, instruments and techniques.

- **Participation**

To enable stakeholders to participate in setting standards and co-ordinating the achievement of the qualification.

- **Access**

To address barriers to learning at each level to facilitate students' progress.

- **Progression**

To ensure that the qualification framework permits individuals to move through the levels of the national qualification via different, appropriate combinations of the components of the delivery system.

- **Portability**

To enable students to transfer credits of qualifications from one learning institution and/or employer to another institution or employer.

- **Articulation**

To allow for vertical and horizontal mobility in the education system when accredited pre-requisites have been successfully completed.

- **Recognition of Prior Learning**

To grant credits for a unit of learning following an assessment or if a student possesses the capabilities specified in the outcomes statement.

- **Validity of assessments**

To ensure assessment covers a broad range of knowledge, skills, values and attitudes (SKVAs) needed to demonstrate applied competency. This is achieved through:

- clearly stating the outcome to be assessed;
- selecting the appropriate or suitable evidence;
- matching the evidence with a compatible or appropriate method of assessment; and
- selecting and constructing an instrument(s) of assessment.

- **Reliability**

To assure assessment practices are consistent so that the same result or judgment is arrived at if the assessment is replicated in the same context. This demands consistency in the interpretation of evidence; therefore, careful monitoring of assessment is vital.

- **Fairness and transparency**

To verify that no assessment process or method(s) hinders or unfairly advantages any student. The following could constitute unfairness in assessment:

- Inequality of opportunities, resources or teaching and learning approaches
- Bias based on ethnicity, race, gender, age, disability or social class
- Lack of clarity regarding Learning Outcome being assessed
- Comparison of students' work with other students, based on learning styles and language

- **Practicability and cost-effectiveness**

To integrate assessment practices within an outcomes-based education and training system and strive for cost and time-effective assessment.

2 ASSESSMENT FRAMEWORK FOR VOCATIONAL QUALIFICATIONS

The assessment structure for the National Certificates (Vocational) qualification is as follows:

2.1 Internal continuous assessment (ICASS)

Knowledge, skills values, and attitudes (SKVAs) are assessed throughout the year using assessment instruments such as projects, tests, assignments, investigations, role-play and case studies. The internal continuous assessment (ICASS) practical component is undertaken in a real workplace, a workshop or a "Structured Environment". This component is moderated internally and externally quality assured by Umalusi. All internal continuous assessment (ICASS) evidence is kept in a Portfolio of Evidence (PoE) and must be readily available for monitoring, moderation and verification purposes.

2.2 External summative assessment (ESASS)

The external summative assessment is either a single or a set of written papers set to the requirements of the Subject Learning Outcomes. The Department of Education administers the theoretical component according to relevant assessment policies.

A compulsory component of external summative assessment (ESASS) is the **integrated summative assessment task (ISAT)**. This assessment task draws on the students' cumulative learning throughout the year. The task requires **integrated application of competence** and is executed under strict assessment conditions. The task should take place in a simulated or "Structured Environment". The integrated summative assessment task (ISAT) is the most significant test of students' ability to apply their acquired knowledge.

The integrated assessment approach allows students to be assessed in more than one subject with the same integrated summative assessment task (ISAT).

External summative assessments will be conducted annually between October and December, with provision made for supplementary sittings.

3 MODERATION OF ASSESSMENT

3.1 Internal moderation

Assessment must be moderated according to the internal moderation policy of the Further Education and Training (FET) college. Internal college moderation is a continuous process. The moderator's involvement starts with the planning of assessment methods and instruments and follows with continuous collaboration with and support to the assessors. Internal moderation creates common understanding of Assessment Standards and maintains these across vocational programmes.

3.2 External moderation

External moderation is conducted by the Department of Education, Umalusi and, where relevant, an Education and Training Quality Assurance (ETQA) body according to South African Qualifications Authority (SAQA) and Umalusi standards and requirements.

The external moderator:

- monitors and evaluates the standard of all summative assessments;
- maintains standards by exercising appropriate influence and control over assessors;
- ensures proper procedures are followed;
- ensures summative integrated assessments are correctly administered;
- observes a minimum sample of ten (10) to twenty-five (25) percent of summative assessments;
- gives written feedback to the relevant quality assessor; and
- moderates in case of a dispute between an assessor and a student.

Policy on inclusive education requires that assessment procedures for students who experience barriers to learning be customised and supported to enable these students to achieve their maximum potential.

4 PERIOD OF VALIDITY OF INTERNAL CONTINUOUS ASSESSMENT (ICASS)

The period of validity of the internal continuous assessment mark is determined by the *National Policy on the Conduct, Administration and Management of the Assessment of the National Certificates (Vocational)*.

The internal continuous assessment (ICASS) must be re-submitted with each examination enrolment for which it constitutes a component.

5 ASSESSOR REQUIREMENTS

Assessors must be subject specialists and should ideally be declared competent against the standards set by the ETDP SETA. If the lecturer conducting the assessments has not been declared a competent assessor, an assessor who has been declared competent may be appointed to oversee the assessment process to ensure the quality and integrity of assessments.

6 TYPES OF ASSESSMENT

Assessment benefits the student and the lecturer. It informs students about their progress and helps lecturers make informed decisions at different stages of the learning process. Depending on the intended purpose, different types of assessment can be used.

6.1 Baseline assessment

At the beginning of a level or learning experience, baseline assessment establishes the knowledge, skills, values and attitudes (SKVAs) that students bring to the classroom. This knowledge assists lecturers to plan learning programmes and learning activities.

6.2 Diagnostic assessment

This assessment diagnoses the nature and causes of learning barriers experienced by specific students. It is followed by guidance, appropriate support and intervention strategies. This type of assessment is useful to make referrals for students requiring specialist help.

6.3 Formative assessment

This assessment monitors and supports teaching and learning. It determines student strengths and weaknesses and provides feedback on progress. It determines if a student is ready for summative assessment.

6.4 Summative assessment

This type of assessment gives an overall picture of student progress at a given time. It determines whether the student is sufficiently competent to progress to the next level.

7 PLANNING ASSESSMENT

An assessment plan should cover three main processes:

7.1 Collecting evidence

The assessment plan indicates which Subject Outcomes and Assessment Standards will be assessed, what assessment method or activity will be used and when this assessment will be conducted.

7.2 Recording

Recording refers to the assessment instruments or tools with which the assessment will be captured or recorded. Therefore, appropriate assessment instruments must be developed or adapted.

7.3 Reporting

All the evidence is put together in a report to deliver a decision for the subject.

8 METHODS OF ASSESSMENT

Methods of assessment refer to who carries out the assessment and includes lecturer assessment, self-assessment, peer assessment and group assessment.

LECTURER ASSESSMENT	The lecturer assesses students' performance against given criteria in different contexts, such as individual work, group work, etc.
SELF-ASSESSMENT	Students assess their own performance against given criteria in different contexts, such as individual work, group work, etc.
PEER ASSESSMENT	Students assess another student or group of students' performance against given criteria in different contexts, such as individual work, group work, etc.
GROUP ASSESSMENT	Students assess the individual performance of other students within a group or the overall performance of a group of students against given criteria.

9 INSTRUMENTS AND TOOLS FOR COLLECTING EVIDENCE

All evidence collected for assessment purposes is kept or recorded in the student's Portfolio of Evidence (PoE).

The following table summarises a variety of methods and instruments for collecting evidence. A method and instrument is chosen to give students ample opportunity to demonstrate the Subject Outcome has been attained. This will only be possible if the chosen methods and instruments are appropriate for the target group and the Specific Outcome being assessed.

	METHODS FOR COLLECTING EVIDENCE		
	Observation-based (Less structured)	Task-based (Structured)	Test-based (More structured)
Assessment instruments	<ul style="list-style-type: none"> • Observation • Class questions • Lecturer, student, parent discussions 	<ul style="list-style-type: none"> • Assignments or tasks • Projects • Investigations or research • Case studies • Practical exercises • Demonstrations • Role-play • Interviews 	<ul style="list-style-type: none"> • Examinations • Class tests • Practical examinations • Oral tests • Open-book tests
Assessment tools	<ul style="list-style-type: none"> • Observation sheets • Lecturer's notes • Comments 	<ul style="list-style-type: none"> • Checklists • Rating scales • Rubrics 	<ul style="list-style-type: none"> • Marks (e.g. %) • Rating scales (1-7)
Evidence	<ul style="list-style-type: none"> • Focus on individual students • Subjective evidence based on lecturer observations and impressions 	<p>Open middle: Students produce the same evidence but in different ways.</p> <p>Open end: Students use same process to achieve different results.</p>	Students answer the same questions in the same way, within the same time.

10 TOOLS FOR ASSESSING STUDENT PERFORMANCE

Rating scales are marking systems where a symbol (such as 1 to 7) or a mark (such as 5/10 or 50%) is defined in detail. The detail is as important as the coded score. Traditional marking, assessment and evaluation mostly used rating scales without details such as what was right or wrong, weak or strong, etc.

Task lists and **checklists** show the student what needs to be done. They consist of short statements describing the expected performance in a particular task. The statements on the checklist can be ticked off when the student has adequately achieved the criterion. Checklists and task lists are useful in peer or group assessment activities.

Rubrics are a hierarchy (graded levels) of criteria with benchmarks that describe the minimum level of acceptable performance or achievement for each criterion. It is a different way of assessment and cannot be compared to tests. Each criterion described in the rubric must be assessed separately. Mainly, two types of rubrics, namely holistic and analytical, are used.

11 SELECTING AND/OR DESIGNING RECORDING AND REPORTING SYSTEMS

The selection or design of recording and reporting systems depends on the purpose of recording and reporting student achievement. **Why** particular information is recorded and **how** it is recorded determine which instrument will be used.

Computer-based systems, for example spreadsheets, are cost and time effective. The recording system should be user-friendly and information should be easily accessed and retrieved.

12 COMPETENCE DESCRIPTIONS

All assessment should award marks to evaluate specific assessment tasks. However, marks should be awarded against rubrics and not simply be a total of ticks for right answers. Rubrics should explain the competence level descriptors for the skills, knowledge, values and attitudes (SKVAs) a student must demonstrate to achieve each level of the rating scale.

When lecturers or assessors prepare an assessment task or question, they must ensure that the task or question addresses an aspect of a Subject Outcome. The relevant Assessment Standard must be used to create the rubric to assess the task or question. The descriptions must clearly indicate the minimum level of attainment for each category on the rating scale.

13 STRATEGIES FOR COLLECTING EVIDENCE

A number of different assessment instruments may be used to collect and record evidence. Examples of instruments that can be (adapted and) used in the classroom include:

13.1 Record sheets

The lecturer observes students working in a group. These observations are recorded in a summary table at the end of each project. The lecturer can design a record sheet to observe students' interactive and problem-solving skills, attitudes towards group work and involvement in a group activity.

13.2 Checklists

Checklists should have clear categories to ensure that the objectives are effectively met. The categories should describe how the activities are evaluated and against what criteria they are evaluated. Space for comments is essential.

SECTION C: ASSESSMENT IN FITTING AND TURNING

1 SCHEDULE OF ASSESSMENT

At NQF levels 2, 3 and 4, lecturers will conduct assessments as well as develop a schedule of formal assessments that will be undertaken in the year. All three levels also have an external examination that accounts for 50 percent of the total mark. The marks allocated to assessment tasks completed during the year, kept or recorded in a Portfolio of Evidence (PoE) account for the other 50 percent.

The Portfolio of Evidence (PoE) and the external assessment include practical and written components. The practical assessment in Fitting and Turning must, where necessary, be subjected to external moderation by Umalusi or an appropriate Education and Training Quality Assurance (ETQA) body, appointed by the Umalusi Council in terms of Section 28(2) of the *General and Further Education and Training Quality Assurance Act, 2001 (Act No. 58 of 2001)*.

2 RECORDING AND REPORTING

Fitting and Turning, as is the case for all the other Vocational subjects, is assessed according to five levels of competence. The level descriptions are explained in the following table.

Scale of Achievement for the Vocational component

RATING CODE	RATING	MARKS %
5	Outstanding	80-100
4	Highly competent	70-79
3	Competent	50-69
2	Not yet competent	40-49
1	Not achieved	0-39

The programme of assessment should be recorded in the Lecturer's Portfolio of Assessment for each subject. The following should at least be included in the Lecturer's Assessment Portfolio:

- A contents page
- The formal schedule of assessment
- The requirements for each assessment task
- The tools used for each assessment task
- Recording instrument(s) for each assessment task
- A mark sheet and report for each assessment task

The college must standardise these documents.

The student's Portfolio of Evidence (PoE) must at least include:

- A contents page
- The assessment tasks according to the assessment schedule
- The assessment tools or instruments for the task

- A record of the marks (and comments) achieved for each task

Where tasks cannot be contained as evidence in the Portfolio of Evidence (PoE), its exact location must be recorded and it must be readily available for moderation purposes.

The following units guide internal assessment in Fitting and Turning Level 2:

NUMBER OF UNITS	ASSESSMENT	COVERAGE
4	Formal written tests	Two or three completed topics
1	Internal written exam	All completed topics
4	Practical assessments	Must cover the related Subject Outcomes: For example: Turn material with lathe to produce a bullet hinge.

ASSESSMENT OF FITTING AND TURNING
LEVEL 2

3 INTERNAL ASSESSMENT OF SUBJECT OUTCOMES IN FITTING AND TURNING – LEVEL 2

Topic 1: Mark Off Basic Engineering Shapes

SUBJECT OUTCOME	
Plan and prepare materials and equipment for marking off.	
ASSESSMENT STANDARDS	LEARNING OUTCOMES
<ul style="list-style-type: none"> Job instructions or production schedule are read. Templates and marking off equipment are selected. Material for marking off is prepared to meet the requirements of the job. 	<ul style="list-style-type: none"> Identify material for the job. Identify equipment for marking off. Identify marking point
ASSESSMENT TASKS OR ACTIVITIES	
<ul style="list-style-type: none"> Materials and equipment are correctly identified. Template is selected. The preparation of materials meets the requirements of the job. 	

SUBJECT OUTCOME	
Mark off materials using templates.	
ASSESSMENT STANDARDS	LEARNING OUTCOMES
<ul style="list-style-type: none"> Correct templates and marking off equipment are selected. Materials are laid out in such a way to limit waste. Materials are marked off. 	<ul style="list-style-type: none"> Position template to eliminate waste. Inspect marking position. Place templates on material. Produce marking.
ASSESSMENT TASKS OR ACTIVITIES	
<ul style="list-style-type: none"> The selection of correct templates, materials and marking off equipment is clear. 	

SUBJECT OUTCOME	
Apply quality checks on machined component.	
ASSESSMENT STANDARDS	LEARNING OUTCOMES
<ul style="list-style-type: none"> Job is continuously checked for quality according to procedures. Quality checks are performed on completed work. 	<ul style="list-style-type: none"> Select equipment and tools for quality checking. Identify things to be checked. Write a report.
ASSESSMENT TASKS OR ACTIVITIES	
<ul style="list-style-type: none"> Quality checks are done continuously according to procedures. 	

SUBJECT OUTCOME	
Care for and store marking-off equipment.	
ASSESSMENT STANDARD	LEARNING OUTCOMES
<ul style="list-style-type: none"> Marking-off equipment is cared for and stored. <p><i>Range: Caring for marking-off equipment includes sharpening of pencils, scribes and dividers, cleaning and refilling.</i></p>	<ul style="list-style-type: none"> Keep the marking-off equipment clean. Store equipment in a safe place. Use equipment correctly. Put equipment in a toolbox. Apply oil sparingly to equipment.

ASSESSMENT TASKS OR ACTIVITIES
<ul style="list-style-type: none"> • Pencils, scribes and dividers are sharpened accurately. • Equipment is stored in a safe place.

SUBJECT OUTCOME	
Work safely with due care for self, fellow workers, equipment, materials and the environment.	
ASSESSMENT STANDARDS	LEARNING OUTCOMES
<ul style="list-style-type: none"> • A clean and tidy work environment is maintained. • Work is carried out in a safe manner 	<ul style="list-style-type: none"> • Apply worksite health and safety practices. • Apply good housekeeping. • Clean work area after the completion of the task. • Clean equipment, materials and machines after use. • Wear safety clothes.
ASSESSMENT TASKS OR ACTIVITIES	
<ul style="list-style-type: none"> • The working environment is clean, tidy and maintained. • The application of worksite health and safety practices is clear. 	

SUBJECT OUTCOME	
Compile documentation and a feedback report.	
ASSESSMENT STANDARD	LEARNING OUTCOMES
<ul style="list-style-type: none"> • Reporting is done on time and accurately. 	<ul style="list-style-type: none"> • Compile reports in order of completion of tasks. • Compile feedback reports in order. • Double-check the reports for correctness. • Store reports in a safe place.
ASSESSMENT TASKS OR ACTIVITIES	
<ul style="list-style-type: none"> • Reporting is done accurately and on time. 	

Topic 2: Operate and Monitor a Drilling Machine to Produce Simple Components

SUBJECT OUTCOME	
Prepare for work activity.	
ASSESSMENT STANDARDS	LEARNING OUTCOMES
<ul style="list-style-type: none"> • Drawings and job instructions are interpreted and sequence of operations is determined. • Machine is prepared for operation including lubrication, routine maintenance and pre-operational checks. • A check is performed to determine the required materials and tools at the workstation. • Components are marked out, if required. 	<ul style="list-style-type: none"> • Select correct tools and equipment for the job. • Choose materials for the job and calculate revolutions per minute (RPM). • Indicate time to be taken for the job.
ASSESSMENT TASKS OR ACTIVITIES	
<ul style="list-style-type: none"> • The interpretation of drawings and job instructions is clear and precise. • The preparation for machine operation is complete. • The checking of materials and tools required at workstation is correctly done. 	

SUBJECT OUTCOME	
Set drilling machine.	
ASSESSMENT STANDARDS	LEARNING OUTCOMES
<ul style="list-style-type: none"> • The accessories and work holding fixtures are selected and installed. • The tools are selected, prepared and installed. 	<ul style="list-style-type: none"> • Fit selected tooling to drill spindle. • Calculate required speed and adjust machine speed. • Clamp work piece in position relative to drill centre and line axis.

<ul style="list-style-type: none"> • Cutting speeds and feeds are selected and set. 	
ASSESSMENT TASKS OR ACTIVITIES	
<ul style="list-style-type: none"> • The selection of required accessories and work holding fixtures is accurate. • The installation of required tools is correct. • The selection and setting of cutting speeds and feeds is according to manufacturer specifications. 	

SUBJECT OUTCOME	
Perform drilling operations.	
ASSESSMENT STANDARDS	LEARNING OUTCOMES
<ul style="list-style-type: none"> • Drilling machine is started and shut down. • Drilling machine is monitored while in operation by adjusting speeds and feeds where required. • Machined component is removed on completion of drilling process. 	<ul style="list-style-type: none"> • Start drilling machine. • Monitor drilling machine. • Adjust speeds and feeds.
ASSESSMENT TASKS OR ACTIVITIES	
<ul style="list-style-type: none"> • The starting up and shutting down of machine is done according to manufacturer specifications. • The adjustment of speeds and feeds meet manufacture specifications. 	

SUBJECT OUTCOME	
Apply quality checks on machined component.	
ASSESSMENT STANDARDS	LEARNING OUTCOMES
<ul style="list-style-type: none"> • Correct tools and equipment for quality checking are selected. • Critical points for checking are identified. 	<ul style="list-style-type: none"> • Select correct tools and equipment for quality checking. • Identify critical points for checking.
ASSESSMENT TASKS OR ACTIVITIES	
<ul style="list-style-type: none"> • The appropriate measuring equipment is selected and prepared. 	

SUBJECT OUTCOME	
Recognise and report problems, changes and/or malfunctions while operating.	
ASSESSMENT STANDARD	LEARNING OUTCOME
<ul style="list-style-type: none"> • Malfunctions are recognised and reported. 	<ul style="list-style-type: none"> • Recognise and report malfunctions.
ASSESSMENT TASKS OR ACTIVITIES	
<ul style="list-style-type: none"> • Machine component is checked accurately. 	

SUBJECT OUTCOME	
Record information on work done.	
ASSESSMENT STANDARD	LEARNING OUTCOME
<ul style="list-style-type: none"> • A name is selected for the file. • The information on work done is recorded in the file. • The file is saved for reference purposes. 	<ul style="list-style-type: none"> • Select a name for the file. • Record the information on work done in the file. • Save the file for reference purposes.
ASSESSMENT TASKS OR ACTIVITIES	
<ul style="list-style-type: none"> • Information on work done is recorded. 	

SUBJECT OUTCOME	
Work safely with due care for self, fellow workers, equipment, materials and the environment.	

ASSESSMENT STANDARD	LEARNING OUTCOMES
<ul style="list-style-type: none"> The use of guards, correct coolants and appropriate personal protective equipment are included as safe working practices. 	<ul style="list-style-type: none"> Apply worksite health and safety practices. Apply good housekeeping. Clean work area after the completion of the task. Clean equipment, materials and machines after use.
ASSESSMENT TASKS OR ACTIVITIES	
<ul style="list-style-type: none"> Safe guards, correct coolant and appropriate personal protective equipment are used. 	

Topic 3: Operate and Monitor a Milling Machine to Produce Simple Components

SUBJECT OUTCOME	
Prepare for work activity.	
ASSESSMENT STANDARDS	LEARNING OUTCOMES
<ul style="list-style-type: none"> Drawings and job instructions are interpreted and sequence of operations is determined. Machine is prepared for operation including lubrication, routine maintenance and pre-operational checks. A check is performed to determine the required materials and tools at the workstation. Components are marked out, if required. 	<ul style="list-style-type: none"> Select tools and equipment required for the milling operation. Check whether tools and equipment are in good working condition. Check whether the machine is in good working condition. Check whether the safety sign is in place.
ASSESSMENT TASKS OR ACTIVITIES	
<ul style="list-style-type: none"> The interpretation of drawings and job instructions is clear and precise. The preparation of the machine for operation is complete. The checking of materials and tools required at workstation is correctly done. 	

SUBJECT OUTCOME	
Set milling machine.	
ASSESSMENT STANDARDS	LEARNING OUTCOMES
<ul style="list-style-type: none"> The required accessories and work holding fixtures are selected and installed. The required tools are selected, prepared and installed. Cutting speeds and feeds are selected and set. 	<ul style="list-style-type: none"> Identify the type of cutting tool. Make calculations for the diameter and type of cutter. Make calculations on RPM. Calculate the depth of cut. Calculate the feed rate. Calculate indexing Set clamping arrangement. Set angle plate. Position the work piece correctly. Check table X and Y axis that is perpendicular to spindle axis.
ASSESSMENT TASKS OR ACTIVITIES	
<ul style="list-style-type: none"> The selection of required accessories and work holding fixtures is accurate. The installation of required tools is correct. The selection and setting of cutting speeds and feeds is according to manufacturer specifications. 	

SUBJECT OUTCOME	
Perform milling operations.	
ASSESSMENT STANDARDS	LEARNING OUTCOMES
<ul style="list-style-type: none"> Milling machine is started and shut down. Milling machine is monitored while in operation by adjusting speeds and feeds where required. The machined component is removed on completion 	<ul style="list-style-type: none"> Assess X and Y axis backlash. Position cutter and set cutting depth and width. Set graduated dials to zero. Flood cutter with soluble oil.

<ul style="list-style-type: none"> of the milling process. Milling machine is cleaned. 	<ul style="list-style-type: none"> Apply automatic or manual feed.
ASSESSMENT TASKS OR ACTIVITIES	
<ul style="list-style-type: none"> The removal of machined component on completion of milling processes is accurate. The milling machine is monitored while in operation. 	

SUBJECT OUTCOME	
Apply quality checks on machined component.	
ASSESSMENT STANDARDS	LEARNING OUTCOME
<ul style="list-style-type: none"> Appropriate measuring equipment is selected. Component is measured. 	<ul style="list-style-type: none"> Check that the machined component surface conforms to the specifications. Check that the milled piece conforms to the drawing dimensions.
ASSESSMENT TASKS OR ACTIVITIES	
<ul style="list-style-type: none"> The appropriate measuring equipment is prepared, selected and measured. 	

SUBJECT OUTCOME	
Recognise and report problems, changes and/or malfunctions while operating.	
ASSESSMENT STANDARD	LEARNING OUTCOMES
<ul style="list-style-type: none"> Machined component is checked against specifications. 	<ul style="list-style-type: none"> Recognise and report problems. Recognise and report changes. Recognise malfunctions.
ASSESSMENT TASKS OR ACTIVITIES	
<ul style="list-style-type: none"> Machined component is checked against specifications. 	

SUBJECT OUTCOME	
Record information on work done.	
ASSESSMENT STANDARD	LEARNING OUTCOMES
<ul style="list-style-type: none"> Conformance of component to specifications is documented. 	<ul style="list-style-type: none"> Select a name for the file. Record information on work done in the file. Save the file for reference purposes.
ASSESSMENT TASKS OR ACTIVITIES	
<ul style="list-style-type: none"> Information is recorded accurately. 	

SUBJECT OUTCOME	
Work safely with care for self, fellow workers, machines, equipment, materials and environment.	
ASSESSMENT STANDARD	LEARNING OUTCOMES
<ul style="list-style-type: none"> The use of guards, correct coolants and appropriate personal protective equipment are included as safe working practices. 	<ul style="list-style-type: none"> Apply worksite health and safety practices. Clean equipment, materials and machines after use. Wear safety clothes. Clean work area after completion of the task. Apply good housekeeping.
ASSESSMENT TASKS OR ACTIVITIES	
<ul style="list-style-type: none"> Safe guards, correct coolant and appropriate personal protective equipment are used. 	

Topic 4: Operate and Monitor a Surface-grinding Machine to Produce Simple Components

SUBJECT OUTCOME	
Prepare for work activity.	
ASSESSMENT STANDARDS	LEARNING OUTCOMES
<ul style="list-style-type: none"> • Drawings and job instructions are interpreted and sequence of operations is determined. • Machine is prepared for operation including lubrication, routine maintenance and pre-operational checks. • A check is performed to determine the required materials and tools at the workstation. • Components are marked out, if required. 	<ul style="list-style-type: none"> • Select tools and equipment required for surface-grinding operation. • Check whether tools and equipment are in good working condition. • Check whether the machine is in good working condition. • Practice workshop safety. • Select correct wheel for grinding operation. • Determine material type. • Check wheel RPM specification. • Assess wheel condition.
ASSESSMENT TASKS OR ACTIVITIES	
<ul style="list-style-type: none"> • The interpretation of drawings and job instructions is clear and precise. • The preparation of the machine for operation is complete. • The checking of materials and tools required at workstation is correctly done. 	

SUBJECT OUTCOME	
Set surface-grinding machine.	
ASSESSMENT STANDARDS	LEARNING OUTCOMES
<ul style="list-style-type: none"> • The wheel is dressed and balanced. • The height of the grinding wheel is adjusted. • The component correctly positioned on surface-grinding table. • The component is fixed to grinding table using magnetic table or clamp. • The automatic feed operation is adjusted to suit work piece parameters. • The type of grinding operation (peripheral or facing) is identified. 	<ul style="list-style-type: none"> • Dress and balance the wheel. • Adjust height of grinding wheel. • Position component correctly on surface-grinding table. • Fix component to grinding table using magnetic table or clamp. • Adjust automatic feed operation to suit work piece parameters. • Identify the type of grinding operation (peripheral or facing)
ASSESSMENT TASKS OR ACTIVITIES	
<ul style="list-style-type: none"> • The selection of required accessories and work holding fixtures is accurate. • The installation of required tools is correct. • The selection and setting of cutting speeds and feeds is according to manufacturer specifications. 	

SUBJECT OUTCOME	
Perform surface-grinding operations.	
ASSESSMENT STANDARDS	LEARNING OUTCOMES
<ul style="list-style-type: none"> • The automatic lubrication system is applied. • The depth is set and it is started. • Automatic feed is engaged. • The lateral table movement is adjusted. • Coolant and flood work piece is adjusted. 	<ul style="list-style-type: none"> • Apply automatic lubrication system. • Start and set depth. • Engage automatic feed. • Adjust lateral table movement. • Adjust coolant and flood work piece.
ASSESSMENT TASKS OR ACTIVITIES	
<ul style="list-style-type: none"> • The machined component, on completion of the grinding process, is correctly removed. • Monitoring of surface grinding machine is done well according to manufacturer specification. 	

SUBJECT OUTCOME	
Apply quality checks on machined component.	
ASSESSMENT STANDARDS	LEARNING OUTCOMES
<ul style="list-style-type: none"> • The correct tools and equipment for quality checking are selected. • Values to be checked are identified. • Grinding operation are checked and necessary adjustments are made. • Surface finish is checked. 	<ul style="list-style-type: none"> • Select correct tools and equipment for quality checking. • Identify values to be checked. • Check grinding operation and make necessary adjustments. • Check surface finish.
ASSESSMENT TASKS OR ACTIVITIES	
<ul style="list-style-type: none"> • Selection and preparation of measuring equipment is precise. • Component is measured according to specifications. 	

SUBJECT OUTCOME	
Record information on work done.	
ASSESSMENT STANDARD	LEARNING OUTCOMES
<ul style="list-style-type: none"> • Conformance of component to specifications is documented. 	<ul style="list-style-type: none"> • Name the file. • Record information. • Save the file.
ASSESSMENT TASKS OR ACTIVITIES	
<ul style="list-style-type: none"> • Information is recorded accurately. 	

SUBJECT OUTCOME	
Recognise and report problems, changes and/or malfunctions while operating.	
ASSESSMENT STANDARD	LEARNING OUTCOMES
<ul style="list-style-type: none"> • Malfunctions are recognised and reported. 	<ul style="list-style-type: none"> • Recognise and report malfunctions
ASSESSMENT TASKS OR ACTIVITIES	
<ul style="list-style-type: none"> • Information is reported. 	

SUBJECT OUTCOME	
Record information on work done	
ASSESSMENT STANDARD	LEARNING OUTCOMES
<ul style="list-style-type: none"> • A name for the file is selected. • The information on work done is recorded in the file • The file is saved for reference purposes 	<ul style="list-style-type: none"> • Select a name for the file • Record the information on work done in the file • Save the file for reference purposes
ASSESSMENT TASKS OR ACTIVITIES	
<ul style="list-style-type: none"> • Information is recorded accurately. 	

SUBJECT OUTCOME	
Work safely with care for self, fellow workers, machines, equipment, materials and environment.	
ASSESSMENT STANDARD	LEARNING OUTCOMES
<ul style="list-style-type: none"> • The use of guards, correct coolants and appropriate personal protective equipment are included as safe working practices. 	<ul style="list-style-type: none"> • Apply worksite health and safety practices. • Clean equipment, materials and machines after use. • Wear safety clothes. • Clean work area after completion of the task. • Apply good housekeeping.

ASSESSMENT TASKS OR ACTIVITIES
<ul style="list-style-type: none"> • Safe guards, correct coolant and appropriate personal protective equipment are used.

Topic 5: Operate and Monitor a Lathe to Produce Simple Components

SUBJECT OUTCOME	
Prepare for work activity.	
ASSESSMENT STANDARDS	LEARNING OUTCOMES
<ul style="list-style-type: none"> • Drawings and job instructions are interpreted and sequence of operations is determined. • Machine is prepared for operation including lubrication, routine maintenance and pre-operational checks. • A check is performed to determine the required materials and tools at the workstation. • Components are marked out, if required. 	<ul style="list-style-type: none"> • Select tools and equipment required for the lathe operation. • Check whether tools and equipment are in good working condition. • Check whether the machine is in good working condition. • Practice workshop safety.
ASSESSMENT TASKS OR ACTIVITIES	
<ul style="list-style-type: none"> • The interpretation of drawings and job instructions is clear and precise. • The preparation of the machine for operation is complete. • The checking of materials and tools required at workstation is correctly done. 	

SUBJECT OUTCOME	
Set lathe.	
ASSESSMENT STANDARDS	LEARNING OUTCOMES
<ul style="list-style-type: none"> • The required accessories and work holding fixtures are selected and installed. • The required tools are selected, prepared and installed. • Cutting speeds and feeds are selected and set. 	<ul style="list-style-type: none"> • Fit selected cutter in tool post and adjust cutter height. • Set the graduated sleeve of the cross-slide to zero. • Set the compound slide to zero. • Position carriage for cut. • Mount the work piece in a three or four-jaw chuck. • Clamp securely and check the set-up. • Determine work piece diameter and calculate RPM considering material type as well. • Determine feed rate and cutting depth.
ASSESSMENT TASKS OR ACTIVITIES	
<ul style="list-style-type: none"> • The selection of required accessories and work holding fixtures is accurate. • The installation of required tools is correct. • The selection and setting of cutting speeds and feeds is according to manufacturer specifications. 	

SUBJECT OUTCOME	
Perform turning operations.	
ASSESSMENT STANDARDS	LEARNING OUTCOMES
<ul style="list-style-type: none"> • Lathe is started and shut down. • Lathe is monitored while in operation by adjusting speeds and feeds where required. • The machined component is removed on completion of the turning process. • The lathe is cleaned. 	<ul style="list-style-type: none"> • Adjust calculated RPM. • Adjust feed rate. • Set cutter against work piece and adjust cutting depth. • Engage automatic or manual feed.
ASSESSMENT TASKS OR ACTIVITIES	
<ul style="list-style-type: none"> • Machined component is removed on completion of the turning process. • Lathe operation is monitored to specifications. • Lathe machine speed and feed is adjusted. 	

SUBJECT OUTCOME

Apply quality checks on machined component.	
ASSESSMENT STANDARDS	LEARNING OUTCOMES
<ul style="list-style-type: none"> • Correct tools and equipment for quality checking are selected. • Values for checking are identified. • Cutting surface finish is checked. 	<ul style="list-style-type: none"> • Select correct tools and equipment for quality checking. • Identify values for checking. • Check cutting surface finish.
ASSESSMENT TASKS OR ACTIVITIES	
<ul style="list-style-type: none"> • Selection and preparation of measuring equipment is precise. • Component is measured according to specifications. 	

SUBJECT OUTCOME	
Record information on work done.	
ASSESSMENT STANDARD	LEARNING OUTCOMES
<ul style="list-style-type: none"> • Machined component is checked against specifications. 	<ul style="list-style-type: none"> • Select a name for the file. • Record information on work done. • Save the file for reference purposes.
ASSESSMENT TASKS OR ACTIVITIES	
<ul style="list-style-type: none"> • Information is recorded accurately. 	

SUBJECT OUTCOME	
Recognise and report problems, changes and/or malfunctions while operating.	
ASSESSMENT STANDARD	LEARNING OUTCOMES
<ul style="list-style-type: none"> • Conformance of component to specifications is documented. 	<ul style="list-style-type: none"> • Recognise and report problems. • Recognise and report changes. • Recognise and report malfunctions.
ASSESSMENT TASKS OR ACTIVITIES	
<ul style="list-style-type: none"> • Information is recorded accurately. 	

SUBJECT OUTCOME	
Work safely with care for self, fellow workers, machines, equipment, materials and environment.	
ASSESSMENT STANDARD	LEARNING OUTCOMES
<ul style="list-style-type: none"> • The use of guards, correct coolants and appropriate personal protective equipment are included as safe working practices. 	<ul style="list-style-type: none"> • Apply worksite health and safety practices. • Clean equipment, materials and machines after use. • Wear safety clothes. • Clean work area after completion of the task. • Apply good housekeeping.
ASSESSMENT TASKS OR ACTIVITIES	
<ul style="list-style-type: none"> • Safe guards, correct coolant and appropriate personal protective equipment are used. 	

Topic 6: Perform Basic Welding or Joining of Metals

SUBJECT OUTCOME	
Prepare for work activity.	
ASSESSMENT STANDARDS	LEARNING OUTCOMES
<ul style="list-style-type: none"> • Job instructions are read and sequence of operations is determined. • Required heat-related welding or joining equipment and consumables are selected. • Pre-operational checks are carried out on equipment. • Unsafe or worn parts, defective equipment or 	<ul style="list-style-type: none"> • Select tools and equipment required for welding or joining of metals. • Check whether tools and equipment are in good working condition. • Check whether the machine is in good working condition.

<ul style="list-style-type: none"> potential hazards are reported. Materials for welding or joining are prepared. 	<ul style="list-style-type: none"> Practice workshop safety.
ASSESSMENT TASKS OR ACTIVITIES	
<ul style="list-style-type: none"> The sequence of operation is determined. The appropriate welding equipment is selected. Welding material is prepared to suit the job. 	

SUBJECT OUTCOME	
Weld or join metals.	
ASSESSMENT STANDARDS	LEARNING OUTCOMES
<ul style="list-style-type: none"> Work area is prepared for welding or joining process. Work area is secured. Appropriate weld or join process is used. 	<ul style="list-style-type: none"> Select the electrode size. (welding rod) Set the desired amperage. Adjust the shielding gas flow. Adjust the rate of electrode feed. Control the torch movement and electrode extension. Wear welder's clothing. Ventilate welding area. Clean metals before welding or joining.
ASSESSMENT TASKS OR ACTIVITIES	
<ul style="list-style-type: none"> The working area is prepared for welding. The appropriate welding process is used. 	

SUBJECT OUTCOME	
Apply quality checks on completed weld or joint.	
ASSESSMENT STANDARDS	LEARNING OUTCOMES
<ul style="list-style-type: none"> Weld or join is cleaned. Visual checks for quality finishes are conducted. 	<ul style="list-style-type: none"> Examine weld for penetration. Determine whether the weld conforms to the drawing specifications. Identify values to be checked. Check for warping and twisting of work piece. Check dimensions against drawing.
ASSESSMENT TASKS OR ACTIVITIES	
<ul style="list-style-type: none"> Welding material is tidy. Finishes are checked. 	

SUBJECT OUTCOME	
Perform finishing activities.	
ASSESSMENT STANDARDS	LEARNING OUTCOMES
<ul style="list-style-type: none"> Scrap material is disposed of. Surplus materials are stored. Equipment is cleaned and stored. 	<ul style="list-style-type: none"> Clean surplus weld and spatter. Clean work piece surface and apply required surface coating.
ASSESSMENT TASKS OR ACTIVITIES	
<ul style="list-style-type: none"> Scrap material is disposed of. Equipment is clean and stored. Surplus material is stored. 	

SUBJECT OUTCOME
Report non-compliant or unsafe conditions while working.

ASSESSMENT STANDARD	LEARNING OUTCOMES
<ul style="list-style-type: none"> Problems with materials and equipment are reported. 	<ul style="list-style-type: none"> Inspect the working conditions. Identify any problems. List the unsafe conditions. Prepare a report on in-compliant or unsafe conditions.
ASSESSMENT TASKS OR ACTIVITIES	
<ul style="list-style-type: none"> Problems with materials and equipment are reported. 	

SUBJECT OUTCOME	
Work safely with care for self, fellow workers, machines, equipment, materials and environment.	
ASSESSMENT STANDARDS	LEARNING OUTCOMES
<ul style="list-style-type: none"> Unsafe conditions, acts and equipment are reported and corrective action is taken. Work area is restored to a safe and serviceable condition after activity. 	<ul style="list-style-type: none"> Apply worksite health and safety practices. Clean equipment, materials and machines after use. Wear safety clothes. Clean work area after completion of the task. Apply good housekeeping.
ASSESSMENT TASKS OR ACTIVITIES	
<ul style="list-style-type: none"> Workshop safety is practiced. 	

4 SPECIFICATIONS FOR EXTERNAL ASSESSMENT IN FITTING AND TURNING – LEVEL 2

4.1 Integrated summative assessment task (ISAT)

A compulsory component of the external assessment (ESASS) is the **integrated summative assessment task (ISAT)**. The integrated summative assessment task (ISAT) draws on the students' cumulative learning achieved throughout the year. The task requires **integrated application of competence** and is executed and recorded in compliance with assessment conditions.

Two approaches to the integrated summative assessment task (ISAT) may be as follows:

The students are assigned a task at the beginning of the year which they will have to complete in phases throughout the year to obtain an assessment mark. A final assessment is made at the end of the year when the task is completed.

OR

Students achieve the competencies throughout the year but the competencies are assessed cumulatively in a single assessment or examination session at the end of the year.

The integrated summative assessment task (ISAT) is set by an externally appointed examiner and is conveyed to colleges in the first quarter of the year.

The integrated assessment approach enables students to be assessed in more than one subject with the same integrated summative assessment task (ISAT).

4.2 National Examination

A National Examination is conducted annually in October or November by means of a paper(s) set and moderated externally. The following distribution of cognitive application should be followed:

LEVEL 2	KNOWLEDGE AND COMPREHENSION	APPLICATION	ANALYSIS, SYNTHESIS AND EVALUATION
	40%	50%	10%

MARK ALLOCATION PER QUESTION
All questions are compulsory:

Question 1:	Mark Off Basic Regular Engineering Shapes	10 marks
Question 2:	Operate and Monitor a Drilling Machine to Produce Simple Components	20 marks
Question 3:	Operate and Monitor a Milling Machine to Produce Simple Components	20 marks
Question 4:	Operate and Monitor a Surface-grinding Machine to Produce Simple Components	20 marks
Question 5:	Operate and Monitor a Lathe Machine to Produce Simple Components	20 marks
Question 6:	Perform Basic Welding or Joining of Metals	10 marks
TOTAL		100 marks